

TOBACCO INDUSTRY RESEARCH COMMITTEE
350 FIFTH AVENUE NEW YORK 1, N. Y.

Application For Research Grant

Date: October 11th, 1954

1. Name of Investigator:

John T. McLaughlin, M.D.

2. Title:

Director of Biophysics Research

3. Institution

& Address:

Institute of Nuclear and Atomic Sciences
106 Chestnut Street, Burbank, California

4. Project or Subject:

Analysis of Tobacco for radioactivity...a quantitative and qualitative determination by means of mass spectroscopy.

A preliminary survey to determine the feasibility, mechanics and cost of such analyses.

5. Detailed Plan of Procedure (Use reverse side if additional space is needed):

Mass spectroscopy is a proved and accurate method of chemical analysis. We know that there are radioactive isotopes present in tobacco (see Paragraph 10). Now we must determine what they are and in what amounts. Mass spectroscopy is apparently a faster and more accurate method of determination than the current chemical and physical methods. In fact, the chemical isolation of the isotopes is a monumental task. Since mass spectroscopy in solids is a new development done in only a few laboratories it behooves us to survey the problem before attempting to estimate the time and cost of such studies. From the practical viewpoint we must determine if these studies can be done in present facilities on a contract basis, or we should build our own instrument and operate it solely for this study. The people currently doing such analyses have agreed to a trial survey and this application is for money for such a trial in order to determine, practically, how to proceed further.

Therefore, the plan of procedure is to go to the institute where mass spectroscopy on solids is being done and proceed with an analysis of tobacco to determine qualitatively the isotopes present which are radioactive. After this is accomplished an additional application will be made in the light of the knowledge gained.

*It is radioactivity organic or inorganic foods are also radioactive.
Synthetic, i.e., will be to blame & can be controlled
but not one half life, but duration in time of dissemination
of excreted, so want also area exposed per unit of radiation
Antibiotics combine with constituents
Smoking tobacco
could be an etiology for*

1003541633

if it stays there
smoking at the above rate the tumorigenic dose is being exceeded. These figures must be corrected for half-life when the isotope is isolated, but our studies indicate it to be a hard beta emitter. The possible isotopes to be found include those of long and short half-life, but in a cigarette after picking and storing the tobacco, processing the cigarette and then storing these, the short half-life isotopes should be exhausted for practical purposes. Therefore, in our studies we are looking for a long-life hard beta emitting isotope. After the isotope is isolated and animal studies are accomplished then a correction can be made for the biological half-life.

FURTHER STUDIES

These should be done step by step and application made for each successive step.

I. Identification and quantitative study of radioactive isotopes contained in tobacco, tobacco ash and smoke.

A. This can probably be done faster, more accurately and cheaper by mass spectroscopy than by any other means. Many samples and strains should be studied to see if this is a constant or a variable factor.

study
B. If the etiology of the isotopes is not self-evident from the above studies, then separate analyses should be made on the soil, water, fertilizer and air from the area where the tobacco is grown. Similar studies should be done on cigarette paper and any other ingredients of cigarettes.

II. Attempt to isolate offending isotope from lungs invaded by neoplasia.

III. Produce tumors in appropriate animals with this isotope and study the metabolism of this material.

IV. Study of feasible methods of prophylaxis and/or decontamination. In this category one must consider the health and welfare of personnel processing such tobacco.

1003541634

6. Budget Plan:

Salaries	John T. McLaughlin, M.D.	\$1,000.00
Expendable Supplies		
Permanent Equipment		
Overhead	@10%	194.50
Other	Cost of preliminary study	
	at contract laboratory: ^{Total} xxx	500.00
	Travel Expense	445.00
	Total:	2,139.50
		2,139.50

7. Anticipated Duration of Work:

Two months.

8. Facilities and Staff Available:

None required other than John T. McLaughlin, M.D. and his personal clerical assistance.

9. Additional Requirements:

None

10. Additional Information (Including relation of work to other projects and other sources of supply):

This preliminary survey should be accomplished before proceeding by steps with the further studies as here outlined. Realization of the problems of mass spectroscopy on solid material with an instrument sufficient to give a degree of resolution that will isolate and identify isotopes reveals the rationale of such a survey.

MAJOR THESIS

Always will be
Preliminary studies in our laboratories on smoke from one completely burned cigarette revealed a radiation level of 3.75 mr/week. This is more than the figure achieved at the University of Leeds, and we feel that our smoke was contaminated by ash to a small extent. This is an accumulative figure since when smoke is inhaled and then exhaled about 12% of the solid material will remain in the lungs and/or bronchial tree. The average smoker consumes one package of twenty cigarettes/day; therefore, after one week he is exposed to 54 mr/week. Conceding the tumogenic dose of internal radiation (the figure on lung is still undetermined) to be in the vicinity of 30,000 mr/week, it is possible that after ~~five or six~~ weeks of

Signature John T. McLaughlin, M.D.
Director of Project

Kenneth A. Smith, DSc.
Business Officer of the Institution

1003541635